



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/06/02  
  
Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/30/02

RCRA RECORDS CENTER  
FACILITY Pratt & Whitney - Main St  
I.D. NO. CTD990672081  
FILE LOC. R-12  
OTHER RDMS #1086

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A Tier II data validation was performed on data for nine soil samples collected on January 30, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-09-063 through WT-CS-09-064 and WT-CS-10-002 through WT-CS-10-008. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201A96 (batches 13054).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001814) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0126-02-01.7. Aroclor 1254 was spiked into the sample at a concentration of 7.63 ug/l. The performance acceptance limit was 3.91-10.1 ug/l. The laboratory reported a concentration of 6.3 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation*

*techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Seventeen samples were shipped to Premier Laboratory under chain of custody on 01/29/02. Eleven of the samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC 4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001805. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.



## **Field Duplicate**

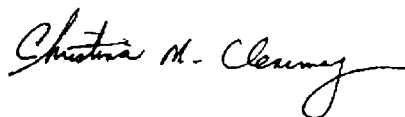
A field duplicate pair was not submitted with this data set.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/05/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/30/02

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A Tier II data validation was performed on data for four soil samples collected on November 30, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201A96.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |

- Initial and Continuing Calibration
- Practical Quantitation Limits
- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on November 30, 2001. The laboratory received the samples on November 30, 2001. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A PE sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 9.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified

based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001813) and all method blanks were evaluated for contamination for VOCs. No detects were reported.

## Surrogate Compounds

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

The following table summarizes VOC data that did not meet acceptance criteria:

Sample Number	Surrogate	%R	QC acceptance Criteria	Detects	Non-detects
2001805MS	Bromofluorobenzene	107	89-106	J	A
2001808MS	Dibromofluoromethane	84	92-107	J	UJ
2001808MS	Dichloroethane-d4	80	86-114	J	UJ

Surrogates were within acceptance limits for the unspiked sample as well as the MSD samples. No qualification was applied to the unspiked sample.

## Internal Standards

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### Matrix Spike / Matrix Spike Duplicate Analyses

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001805 and 2001808. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Bromomethane	44	45	50-147			J	J	Low	2001805
Chloroethane	23	26	60-142			J	J	Low	2001805
1,1-Dichloroethene	59	52	63-118			J	J	Low	2001805
Bromomethane	38		50-147			J	J	Low	2001808
Chloroethane	21	32	60-142	44.0	41	J	J	Low	2001808
1,1,2,2-Tetrachloroethane	127		61-120			J	A	High	2001808

All affected data were qualified accordingly.

### Laboratory Control Sample

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*



All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A PE sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 9.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method

specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be*

*an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs. Since samples 2001792 and 2001796 each had only one surrogate outside the acceptance range, no qualifications were necessary.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

The following table summarizes SVOC QC acceptance criteria that were not met for internal standard (IS) area counts and retention times:

Sample Number	Internal Standards	Area Counts	Ret. Time	Area counts QC Range	Ret.Time QC Range	Detect	Non-detect
2001812	Perylene-d12	567625	24.47	1025217-4100868	24.97-25.97	J	UJ

All compounds quantitated using Perylene-d12 were qualified in sample 2001812. Refer to SVOC Table 3 for a list of affected compounds.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001805. All data met the QC acceptance criteria.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |  |                                     |
|--|-------------------------------------|
| ▪ Performance Evaluation Data              | ▪ Matrix Spike                      |
| ▪ Agreement with Chain of Custody          | ▪ Field Duplicates                  |
| ▪ Preservation and Technical Holding Times | ▪ Laboratory Duplicates             |
|  | ▪ Furnace AA / Post Digestion Spike |
| ▪ Calibration Verification                 | ▪ Laboratory Control Sample         |
| ▪ Blanks                                   | ▪ Serial Dilution Results           |

- ICP Interference Check Sample
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A PE sample was not submitted with this data set.

### **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

### **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of*

*contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001805. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses. Silver was estimated due to low MS / MSD %R (66.5% and 66.5%, respectively), outside the acceptance limits (75-125%). All affected data were qualified accordingly.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A field duplicate pair was not submitted with this data set.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

The following table summarizes data that did not meet acceptance criteria for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Silver	71.4	80-120	J	UJ	All samples in data set.
Lead	137.3	80-120	J	A	All samples in data set.
Selenium	72.6	80-120	J	UJ	All samples in data set.

All data were qualified accordingly.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A PE sample was not submitted with this data set.

### **Preservation and Holding Times**

All samples analyzed for TPH were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.



### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable

### **Matrix Spike**

The MS / MSD was within QC acceptance limits for TPH.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Laboratory Duplicate**

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH.

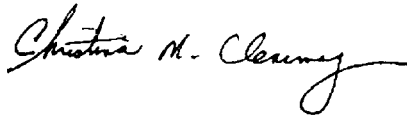
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical

error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane, Bromomethane, and 1,1-Dichloroethene were estimated due to low MS/MSD % recovery for sample 2001805. Chloroethane and Bromomethane were estimated due to low MS/MSD % recovery for sample 2001808. SVOC internal standard perylene-d12 associated compounds were qualified as estimated due to low area count for sample 2001812. Silver was estimated due to low MS / MSD % recovery. Silver, Lead and Selenium were estimated due to low / high LCS % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/04/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/29/02

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A Tier II data validation was performed on data for ten soil samples collected on January 29, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-10-001 and WT-CS-09-055 through WT-CS-09-062. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201A46 (batches 13000).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001798) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0122-02-10.7. Aroclor 1254 was spiked into the sample at a concentration of 7.53 ug/l. The performance acceptance limit was 3.86-9.84 ug/l. The laboratory reported a concentration of 6.1 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 7.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Seventeen samples were shipped to Premier Laboratory under chain of custody on 01/29/02. Eleven of the samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%. All linear regression coefficients ( $R^2$ ) were greater than .990.

Continuing calibration verifications were performed on GC 4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blanks.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

## **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil samples 2001790 and 2001791. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

## **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## **Field Duplicate**

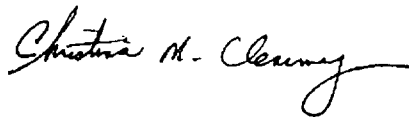
Samples 2001787 / 2001788 were submitted as field duplicate pairs. The RPD for 2001605 / 2001606 was not calculated since both results were non-detect.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/06/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/30/02

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A Tier II data validation was performed on data for nine soil samples collected on January 30, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-09-063 through WT-CS-09-064 and WT-CS-10-002 through WT-CS-10-008. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201A96 (batches 13054).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable



The following tables have been included in this report: Table 1: Tier II Data Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001814) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0126-02-01.7. Aroclor 1254 was spiked into the sample at a concentration of 7.63 ug/l. The performance acceptance limit was 3.91-10.1 ug/l. The laboratory reported a concentration of 6.3 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation*

*techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Seventeen samples were shipped to Premier Laboratory under chain of custody on 01/29/02. Eleven of the samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC 4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001805. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## **Field Duplicate**

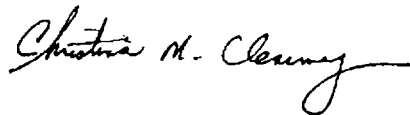
A field duplicate pair was not submitted with this data set.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/04/02  
  
Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/29/02

---

A Tier II data validation was performed on data for four soil samples collected on November 29, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank and performance samples were included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201A46.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |

- Initial and Continuing Calibration
- Practical Quantitation Limits
- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on November 29, 2001. The laboratory received the samples on November 29, 2001. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted..

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Twenty-one VOCs were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 7.0°C. The QC



acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001797) all method blanks were evaluated for contamination for VOCs.

No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001790. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	43	40	60-142		J	J	Low	2001790
2-Hexanone	135		60-134		J	A	High	2001790
4-Methyl-3-pentanone	128		64-126		J	A	High	2001790

All affected data were qualified accordingly.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Forty-one SVOCs were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 7.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

## **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs. Since samples 2001792 and 2001796 each had only one surrogate outside the acceptance range, no qualifications were necessary.

## **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

The following table summarizes SVOC QC acceptance criteria that were not met for internal standard (IS) area counts and retention times:

Sample Number	Internal Standards	Area Counts	Ret. Time	Area counts QC Range	Ret.Time QC Range	Detect	Non-detect
2001792	Chrysene-d12	1015903	22.33	1512125-6048500	21.85-22.85	J	UJ
2001792	Perylene-d12	188304 (<20%)	25.54	870185-3480740	25.05-26.05	J	R
2001796	Chrysene-d12	1182629	22.33	1512125-6048500	21.85-22.85	J	UJ
2001796	Perylene-d12	257007 (<20%)	25.54	870185-3480740	25.05-26.05	J	R

#### Matrix Spike / Matrix Spike Duplicate Analyses

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001790. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Acenaphthene				38.4	37	J	J	High	2001790
Bis(2-chloroethyl)ether				49.6	39	J	J	High	2001790

Bis(2-chloroisopropyl)ether				52.5	41	J	J	High	2001790
4-Chloroaniline				42.2	41	J	J	High	2001790
Di-n-butyl phthalate				24.9	21	J	J	High	2001790
1,2-Dichlorobenzene				59.2	36	J	J	High	2001790
1,3-Dichlorobenzene				64.3	38	J	J	High	2001790
1,4-Dichlorobenzene				63.2	45	J	J	High	2001790

All affected data were qualified accordingly.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

### **INORGANIC DATA REVIEW**

## REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

## DISCUSSION

### Performance Evaluation Data

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Eleven metals were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

### Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

### Calibration Verification



*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001790. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses. Silver was estimated due to low MS / MSD %R (66.8% and 67.4%, respectively), outside the acceptance limits (75-125%). All affected data were qualified accordingly.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and  $\pm 2X$  CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A field duplicate pair was not submitted with this data set.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

All data met the QC acceptance criteria for percent recovery (%R) criteria.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

PE data for TPH was 30 mg/l. The vendor-certified acceptance limits is 34.1-71.1 mg/l. TPH was accepted due to rounding.

### **Preservation and Holding Times**

All samples analyzed for TPH were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable

### **Matrix Spike**

The MS / MSD was within QC acceptance limits for TPH.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Laboratory Duplicate**

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH.

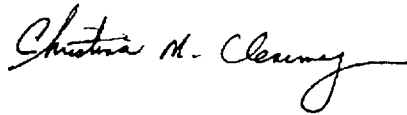
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical

error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane was estimated due to low MS/MSD % recovery. Some SVOC compounds were estimated due to high RPD on the MS/MSD analysis. SVOC internal standards (chrysene-d12 compounds, and perylene-d12 compounds) for samples 2001792 and 20017956 were qualified as estimated / rejected due to low area counts. Silver was estimated due to high MS / MSD % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/28/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/24/02

---

A Tier II data validation was performed on data for five soil samples collected on January 24, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-09-051 through WT-CS-09-054, and WT-CS-08-039. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201881 (batch 12894).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A PE sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 7.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Five samples were shipped to Premier Laboratory under chain of custody on 01/24/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All linear regression coefficients ( $R^2$ ) were greater than .990.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*



Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001756. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	% RPD	RPD limit	Positive detects	NDs	Bias	Affected Samples
Aroclor 1254		173	17-157	79.8	70	J	J	High	2001756

Data were qualified based on high recovery and high RPD accordingly.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

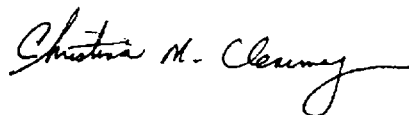
A field duplicate pair was not submitted with this data set..

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Aroclor 1254 was estimated for sample 2001756 due to high MSD % recovery / % RPD.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



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Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
Sample Date: 01/24/02  
DV Date: 01/30/02

Project Name: Willow Brook Pond PCB Remediation  
DV Report for Other Parameters

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A Tier II data validation was performed on data for two soil samples collected on January 24, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201881.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using

the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |

- Initial and Continuing Calibration
- Practical Quantitation Limits
- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Five soil samples and one trip blank were relinquished to Premier Laboratory, LLC under chain-of-custody on January 24, 2002. The laboratory received the samples on January 24, 2002. Two soil samples were selected for “other parameters.” During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 7.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of*

*contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

The trip blank (2001760) and the method blank were evaluated for contamination for VOCs. No detects were reported in the blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All internal standard area counts and retention times were within acceptance limits.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001756 (Batch 12961). The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	47	44	50-147		J	J	Low	2001756

There were no detects reported in the unspiked sample. All affected data were qualified accordingly.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

The laboratory control samples were within acceptance limits.

### **Field Duplicate**

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on*



*laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 7.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice, according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times..

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All internal standard area counts and retention times were within acceptance limits.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001756. All data met the QC acceptance criteria.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

The laboratory control samples were within acceptance limits.

### **Field Duplicate**

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |  |                                     |
|--|-------------------------------------|
| ▪ Performance Evaluation Data              | ▪ Matrix Spike                      |
| ▪ Agreement with Chain of Custody          | ▪ Field Duplicates                  |
| ▪ Preservation and Technical Holding Times | ▪ Laboratory Duplicates             |
| ▪ Calibration Verification                 | ▪ Furnace AA / Post Digestion Spike |
|  | ▪ Laboratory Control Sample         |

- Blanks
- ICP Interference Check Sample
- Serial Dilution Results
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

### **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001756. The following table summarizes MS/MSD data that did not meet acceptance criteria:

Analyte	MS %R	MSD %R	%R QC Range	Detects	Non-detects	Samples Affected
Copper	132.6%	128.6%	75-125	J	A	All samples in data set
Nickel	129.1%		75-125	J	A	All samples in data set
Zinc	128.2%		75-125	J	A	All samples in data set

All affected data were qualified accordingly

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Lead	232.9%	80-120	J	A	All

All data were qualified accordingly.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data

validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

## REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- |                                       |                             |
|---------------------------------------|-----------------------------|
| ▪ Performance Evaluation Sample Data  | ▪ Matrix Spike              |
| ▪ Agreement with Chain of Custody     | ▪ Field Duplicates          |
| ▪ Preservation and Holding Time       | ▪ Laboratory Duplicates     |
| ▪ Initial Calibration Verification    | ▪ Laboratory Control Sample |
| ▪ Continuing Calibration Verification | ▪ Detection Limit Results   |
| ▪ Blanks                              |                             |

## DISCUSSION

It should be noted that sample 2001758 was originally reported as 4900 mg/kg for TPH. Brian Cutler (LEA) requested that the sample be re-analyzed because he was suspicious of the reported result based on his knowledge of the Site. The sample was re-extracted and re-analyzed and the resulting concentration was non-detected in the sample. The laboratory was asked to provide a written explanation / corrective action. The laboratory's response will be attached to this data validation report.

### Performance Evaluation Data

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and Holding Times**

All samples analyzed for TPH were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

### **Matrix Spike**

A MS / MSD was performed on sample 2001756 and was within QC acceptance limits for %R and RPD for TPH.

### **Field Duplicate**

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going



basis.

### **Laboratory Control Sample**

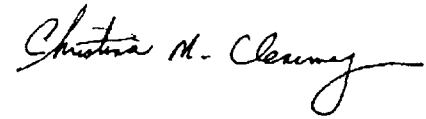
All QC acceptance criteria were met for LCS for TPH.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane was estimated based on low percent recovery for the MS / MSD analyses. Copper, Nickel and Zinc results were qualified as estimated based on high percent recovery for the MS / MSD analyses. Lead results were qualified as estimated based on high percent recovery for the LCS sample. Sample 2001758 was re-extracted and re-analyzed for TPH per request of Brian Cutler. The originally result was 4900 mg/kg. The re-analysis resulted in a non-detected result. The written explanation / corrective action response from the laboratory will be attached to this validation memorandum. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is written in a cursive style with a long, sweeping underline.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
Sample Date: 01/23/02  
DV Date: 01/30/02

Project Name: Willow Brook Pond PCB Remediation  
DV Report for Other Parameters

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A Tier II data validation was performed on data for one soil sample collected on January 23, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The sample discussed in this validation memorandum was analyzed TPH by USEPA 418.1. This parameter is herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201799.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and Holding Times**

All samples analyzed for TPH were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

### **Matrix Spike**

A MS / MSD was performed on sample 2001752 and was within QC acceptance limits for %R and RPD for TPH.

### **Field Duplicate**

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

### **Laboratory Control Sample**

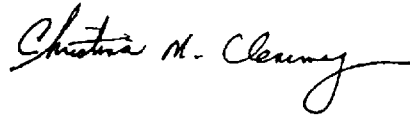
All QC acceptance criteria were met for LCS for TPH.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Paragraph 16 of the Partial Consent Decree Relating to Multiple Parties, Performance of Remedial Work and Cost Recovery have been met.

A handwritten signature in black ink, appearing to read "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/28/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/23/02

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A Tier II data validation was performed on data for four soil samples collected on January 23, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-11-064 through WT-CS-11-067. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201799 (batch 12885).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data



Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A PE sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Four samples were shipped to Premier Laboratory under chain of custody on 01/23/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All linear regression coefficients ( $R^2$ ) were greater than .990.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs. LEA sample (2001752) was diluted out due to elevated concentrations of Aroclor 1248, Aroclor 1254 and Aroclor 1260.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001752 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set..

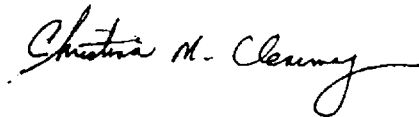
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user

should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/28/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/18/02

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A Tier II data validation was performed on data for thirteen soil samples collected on January 18, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-08-033 through WT-CS-08-038, and WT-CS-11-048 through WT-CS-11-053. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201691 (batches 12802, and 12810).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001733) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0116-02-10.6. Aroclor 1254 was spiked into the sample at a concentration of 2.42 ug/l. The performance acceptance limit was 1.24-3.19 ug/l. The laboratory reported a concentration of 2.4 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation*

*techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.3°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Fifteen samples were shipped to Premier Laboratory under chain of custody on 01/02/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on samples 2001722 and 2001726 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

Samples 2001729 / 2001730 were submitted as field duplicate pairs.. The RPD for



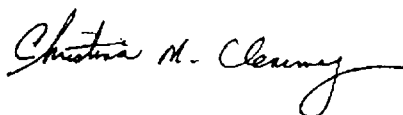
2001729 / 2001730 were not calculated since both results were non-detect.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/28/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 1/22/02

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A Tier II data validation was performed on data for nine wipe samples and two wood samples collected on January 22, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-11-054 through WT-CS-11-63. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201752 (batch 12859-wood & 12870-wipe).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001750) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0116-02-10.7. Aroclor 1254 was spiked into the sample at a concentration of 6.77 ug/l. The performance acceptance limit was 3.47-8.94 ug/l. The laboratory reported a concentration of 6.1 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 3.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Twelve samples were shipped to Premier Laboratory under chain of custody on 01/22/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank or in the equipment blank (2001749).

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs. Decachlorobiphenyl (2) was outside the acceptance limits 2001739 and 2001739MS, however, since only one surrogate was out per sample, no qualifications were necessary.

## **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was not performed on a LEA sample with this data set. A matrix spike / matrix spike duplicate was performed on sample 2001739 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

## **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## **Field Duplicate**

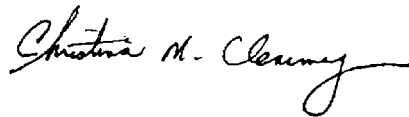
A field duplicate pair was not submitted with this data set.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/12/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/8/02

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A Tier II data validation was performed on data for four soil samples collected on January 18, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as "other" parameters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201691.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds
- Agreement with Chain-of-Custody
- Internal Standards
- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate
- GC/MS Instrument Performance Check
- Laboratory Control Sample
- Initial and Continuing Calibration
- Practical Quantitation Limits



- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on January 18, 2002. The laboratory received the samples on January 18, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Seventeen VOCs were spiked into the sample. All PE data were within vendor-certified acceptance limits.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 6.0°C and 7.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations, with the exception of 4-Methyl-2-pentanone and 2-Hexanone, which were outside the continuing calibration acceptance criteria (27.8 %D, and 29.5 %D, respectively). All affected samples were qualified as estimated.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (20016732) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001722. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	43	40	60-142		J	J	Low	2001722

The non-detect result in the unspiked sample were qualified as an estimated result.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Forty-one SVOCs were spiked into the sample. The following table summarizes the following table summarizes the PE data that were not within vendor-certified acceptance limits:

Compound	Reported Concentration (ug/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
Benzo(a)anthracene	26	42.7	28.3-46	J	J	Low	All samples in data set
Bis (2-Chloroethoxy) methane	23	47.2	24.9-50.8	J	J	Low	All samples in data set
Bis (2-Chloroisopropyl) ether	13	33.4	14-35	J	J	Low	All samples in data set

All affected data were qualified accordingly.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 6.0°C and 7.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and*

*resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All target compounds were within acceptance limits for SVOC compounds for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

## Internal Standards

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

## Matrix Spike / Matrix Spike Duplicate Analyses

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001722. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	RPD limits	Positive detects	NDs	Bias	Affected samples
Bis(2-chloroethyl)ether				40.5	39	J	J	-	2001722
2-Chloroaniline				42.6	41	J	J	-	2001722
Dibenz(a,h)anthracene				36.6	32	J	J	-	2001722
Di-n-butyl phthalate				38.0	41	J	J	-	2001722
1,3-Dichlorobenzene				39.2	38	J	J	-	2001722
2,4-Dimethylphenol				40.6	39	J	J	-	2001722

Fluoranthene				26.2	24	J	J	-	2001722
Hexachlorocyclopentadiene				53.2	41	J	J	-	2001722
Hexachloroethane				41.8	38	J	J	-	2001722
Isophrone				42.5	37	J	J	-	2001722
2-Methylnaphthalene				38.3	37	J	J	-	2001722
2-Methyphenol				37.8	35	J	J	-	2001722
3- & 4-Methylphenols				39.3	35	J	J	-	2001722
Nitrobenzene				44.0	46.2	J	J	-	2001722

The non-detect results in the unspiked sample were qualified as an estimated result.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the SVOC laboratory control sample.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**



No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Seventeen Metals were spiked into the sample. All PE data were within vendor-certified acceptance limits.

### **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

### **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001722. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A field duplicate pair was not submitted with this data set.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

All QC acceptance criteria were met for percent recovery for the metals laboratory control sample.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and Cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method

by which they were analyzed.

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

All PE data for TPH and cyanide were within vendor-certified acceptance limits.

### **Preservation and Holding Times**

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Ds were within 15% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

### **Matrix Spike**

A MS / MSD was performed on sample 2001722 and was within QC acceptance limits for %R and RPD for TPH and cyanide.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH and cyanide.

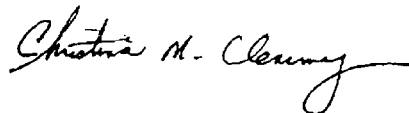
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical

error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane was qualified as rejected based on low percent recovery for the MS and MSD analyses. Many SVOC compounds were qualified as estimated due to high MS / MSD RPD. Benzo(a)anthracene, bis(2-Chloroethoxy)methane, and bis(2-Chloroisopropyl)ether were qualified as estimated due to unacceptable performance evaluation data. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/22/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 1/16/02

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A Tier II data validation was performed on data for five wipe samples collected on January 16, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-11-045 through WT-CS-11-047. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201632 (batch 12754).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.



## **Agreement with the Chain of Custody**

Five samples were shipped to Premier Laboratory under chain of custody on 01/16/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank or in the equipment blank (2001717).

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was not performed on a LEA sample with this data set.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

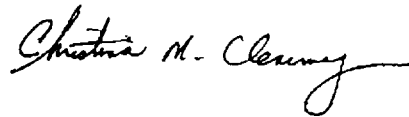
Samples 2001715 and 2001716 were submitted as a field duplicate pair. The relative percent difference was not calculated since no detects were reported in either sample.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/22/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 1/16/02

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A Tier II data validation was performed on data for six soil samples collected on January 16, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-11-039 through WT-CS-11-044. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201566 (batch 12716).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001707) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0109-02-26.6. Aroclor 1254 was spiked into the sample at a concentration of 5.32 ug/l. The performance acceptance limit was 2.72-7.02 ug/l. The laboratory reported a concentration of 4.6 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 12.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Seven samples were shipped to Premier Laboratory under chain of custody on 01/16/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

## **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001703 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

## **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## **Field Duplicate**

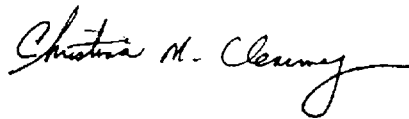
A field duplicate pair was not submitted with this data set.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative





Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/23/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 1/16/02

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A Tier II data validation was performed on data for nine wipe samples collected on January 16, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-08-026 through WT-CS-08-032. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201577 (batch 12718).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Nine samples were shipped to Premier Laboratory under chain of custody on 01/16/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank or in the equipment blank (2001699).

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration*

*target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was not performed on a LEA sample with this data set.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

Samples 2001693 / 2001694 were submitted as field duplicate pairs. The RPD was not calculated (NC) for Aroclor 1254, since the results were less than two times the detection limit.

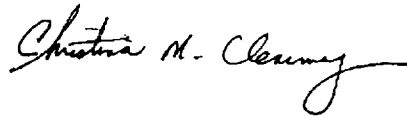
## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should

use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/22/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/16/02

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A Tier II data validation was performed on data for two soil samples collected on January 16, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201566.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG),

Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |
| ▪ Initial and Continuing Calibration | ▪ Practical Quantitation Limits         |
| ▪ Blanks                             | ▪ Tentatively Identified compounds      |

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on January 16, 2002. The laboratory received the samples on January 16, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted..

### **VOLATILE ORGANIC ANALYSES**

#### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Nineteen VOCs were spiked into the sample. All PE data were within vendor-certified acceptance limits.

#### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 12.0°C and 9.0°C. The



QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001706) and all method blanks were evaluated for contamination for

VOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001703. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	45	42	60-142		J	J	Low	2001703

All affected data were qualified accordingly.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Thirty-nine SVOCs were spiked into the sample. The following table summarizes the following table summarizes the PE data that were not within vendor-certified acceptance limits:

Compound	Reported Concentration (ug/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
Anthracene	75	172	84.2-194	J	R	Low	All samples in data set
Benzo(k)fluoranthene	9.0	23.9	10.5-32.8	J	R	Low	All samples in data set
Benzo(a)pyrene	11	24.7	11.6-28.2	J	R	Low	All samples in data set
Chrysene	21	46.4	26.6-53.5	J	R	Low	All samples in data set
Fluoranthene	8.7	13.9	10.4-15.9	J	R	Low	All samples in data set
Hexachlorobenzene	16	38.1	22.1-44.0	J	R	Low	All samples in data set

All affected data were qualified accordingly.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 12.0°C and 9.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding

times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be*

*an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All SVOC QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001703. All data for target compounds met the QC acceptance criteria.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |  |                                     |
|--|-------------------------------------|
| ▪ Performance Evaluation Data              | ▪ Matrix Spike                      |
| ▪ Agreement with Chain of Custody          | ▪ Field Duplicates                  |
| ▪ Preservation and Technical Holding Times | ▪ Laboratory Duplicates             |
|  | ▪ Furnace AA / Post Digestion Spike |
| ▪ Calibration Verification                 | ▪ Laboratory Control Sample         |
| ▪ Blanks                                   | ▪ Serial Dilution Results           |
| ▪ ICP Interference Check Sample            | ▪ Detection Limit Results           |

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Twelve Metals were spiked into the sample. The following table summarizes the following table summarizes the PE data that were not within vendor-certified

acceptance limits:

Compound	Reported Concentration (ug/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
Zinc	140	114	99.8-128	J	A	High	All samples in data set

All affected data were qualified accordingly.

### **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

### **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.



### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001703. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A field duplicate pair was not submitted with this data set.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Lead	252.8	80-120	J	A	All
Zinc	165.6	80-120	J	A	All

All data were qualified accordingly.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample

- Continuing Calibration Verification
- Detection Limit Results
- Blanks

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

PE data for TPH (19.0 mg/L) were not within vendor-certified acceptance limits (34.1-71.1). All samples were qualified accordingly.

### **Preservation and Holding Times**

All samples analyzed for TPH were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

## **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable

## **Matrix Spike**

The MS / MSD was within QC acceptance limits for TPH.

## **Field Duplicate**

A field duplicate pair was not submitted with this data set.

## **Laboratory Duplicate**

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

## **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH.

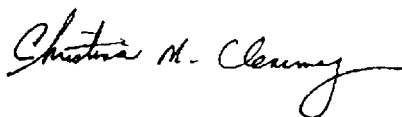
## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and

resultant “total error” of the data.

Chloroethane was estimated due to low MS/MSD % recovery. Some SVOC data were rejected due to low PE results. Zinc and Lead were estimated due to high LCS %R. Zinc was also estimated due to high PE results. TPH was rejected due to low PE results.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Paragraph 16 of the Partial Consent Decree Relating to Multiple Parties, Performance of Remedial Work and Cost Recovery have been met.

A handwritten signature in black ink, appearing to read "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/22/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 1/15/02

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A Tier II data validation was performed on data for fifteen wood samples collected on January 15, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-11-025 through WT-CS-11-038. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201509 (batch 12676).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001690) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0109-02-26.7. Aroclor 1254 was spiked into the sample at a concentration of 2.90 ug/l. The performance acceptance limit was 1.48-3.83 ug/l. The laboratory reported a concentration of 3.1 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Seventeen samples were shipped to Premier Laboratory under chain of custody on 01/15/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank or in the equipment blank (2001689).



## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs. Many surrogate spike recoveries were above the quality control limits for Decachlorobiphenyl (2), as matrix interference caused co-elution. However, no qualification was necessary.

## **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was not performed on a LEA sample with this data set.

## **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## **Field Duplicate**

Samples 2001781 and 2001782 were submitted as a field duplicate pair. Aroclor 1254

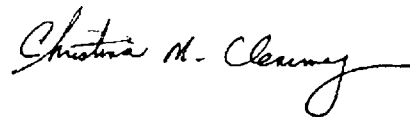
was estimated due to a high relative percent difference (131%). Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. All affected data were qualified accordingly.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Aroclor 1254 was estimated due to high %RPD in the field duplicate precision.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/16/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/14/02

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A Tier II data validation was performed on data for one soil sample collected on January 14, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The sample was collected from locations of the Site designated as WT-CS-11-024. The sample was analyzed for PCBs by USEPA SW846 Method 8082.

The sample was submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported this sample under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201459 (batch 12635).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

One sample was shipped to Premier Laboratory under chain of custody on 01/14/02. The sample was analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001673 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

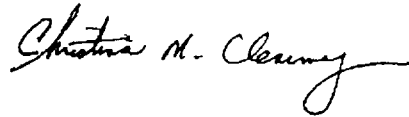
A field duplicate pair was not submitted with this data set.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/14/02  
  
Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/10/02

---

A Tier II data validation was performed on data for five soil samples collected on January 10, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-09-047 through WT-CS-09-050, and WT-CS-02-064 through WT-CS-02-065. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201358 (batch 12561).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable



The following tables have been included in this report: Table 1: Tier II Data Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 7.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The

trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Eight samples were shipped to Premier Laboratory under chain of custody on 01/10/02. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for “other” constituents. Validation of PCBs is discussed in this report. The validation of the “other” constituents is discussed under a separate cover. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001667 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

No field duplicates were submitted with this data set.

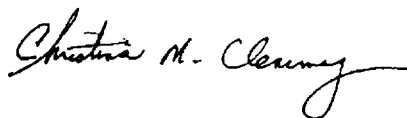
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical

error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/12/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/10/02

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A Tier II data validation was performed on data for five soil samples collected on January 10, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as “other” parameters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201358.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |
| ▪ Initial and Continuing Calibration | ▪ Practical Quantitation Limits         |

- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on January 10 2002. The laboratory received the samples on January 10, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 7.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations, with the exception of 4-Methyl-2-pentanone and 2-Hexanone, which were outside the continuing calibration acceptance criteria (27.8 %D, and 29.5 %D, respectively). All affected samples were qualified as estimated.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*



A trip blank (2001672) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001667. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	0	0	60-142		J	R	Low	2001667
1,1-Dichloroethene	37	32	63-118		J	J	Low	2001667
Carbon disulfide		51	59-126		J	J	Low	2001667

The non-detect results in the unspiked sample were qualified as an estimated / rejected result.

#### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

#### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

#### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

### **SEMIVOLATILE ORGANIC ANALYSES**

#### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 7.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative*

*and quantitative data.*

All target compounds were within acceptance limits for SVOC compounds for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs. 2-Fluorobiphenyl was outside the acceptance limits for sample 2001670, but since it was the only one surrogate out, no qualifications were necessary.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

## Matrix Spike / Matrix Spike Duplicate Analyses

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001667. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	RPD limits	Positive detects	NDs	Bias	Affected samples
Acenaphthene				42.7	37	J	J	-	2001667
Bis(2-chloroethoxy)methane				46.5	43	J	J	-	2001667
Bis(2-chloroethyl)ether				50.6	39	J	J	-	2001667
Bis(2-chloroisopropyl)ether				49.2	41	J	J	-	2001667
2-Chloronaphthalene				44.5	43	J	J	-	2001667
Di-n-butyl phthalate				30.4	21	J	J	-	2001667
Dibenzofuran				42.8	40	J	J	-	2001667
1,2-Dichlorobenzene				50.8	36	J	J	-	2001667
1,3Dichlorobenzene				52.4	38	J	J	-	2001667
1,4Dichlorobenzene				52.9	45	J	J	-	2001667

2,4-Dichlorophenol				45.2	41	J	J	-	2001667
2,4-Dimethylphenol				44.5	39	J	J	-	2001667
2,4-Dinitrophenol				54.7	47	J	J	-	2001667
Fluoranthene				32.8	24	J	J	-	2001667
Hexachlorobutadiene				50.1	46	J	J	-	2001667
Hexachlorocyclopentadiene				56.6	41	J	J	-	2001667
Hexachloroethane				51.6	38	J	J	-	2001667
Isophrone				44.8	37	J	J	-	2001667
2-Methylnaphthalene				46.1	37	J	J	-	2001667
2-Methyphenol				48.3	35	J	J	-	2001667
3- & 4-Methylphenols				46.1	35	J	J	-	2001667
Naphthalene				47.4	41	J	J	-	2001667
Nitrobenzene				46.2	46.2	J	J	-	2001667
2-Nitrophenol				46.0	46.0	J	J	-	2001667
Phenol				49.0	41	J	J	-	2001667
1,2,4-Trichlorobenzene				47.2	43	J	J	-	2001667

The non-detect results in the unspiked sample were qualified as an estimated result.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the SVOC laboratory control sample.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |  |                                     |
|--|-------------------------------------|
| ▪ Performance Evaluation Data              | ▪ Matrix Spike                      |
| ▪ Agreement with Chain of Custody          | ▪ Field Duplicates                  |
| ▪ Preservation and Technical Holding Times | ▪ Laboratory Duplicates             |
| ▪ Calibration Verification                 | ▪ Furnace AA / Post Digestion Spike |
|  | ▪ Laboratory Control Sample         |

- Blanks
- ICP Interference Check Sample
- Serial Dilution Results
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

### **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**



*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001667. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and*

*laboratory precision).*

A field duplicate pair was not submitted with this data set.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

All QC acceptance criteria were met for percent recovery for the metals laboratory control sample.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and Cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                       |                             |
|---------------------------------------|-----------------------------|
| ▪ Performance Evaluation Sample Data  | ▪ Matrix Spike              |
| ▪ Agreement with Chain of Custody     | ▪ Field Duplicates          |
| ▪ Preservation and Holding Time       | ▪ Laboratory Duplicates     |
| ▪ Initial Calibration Verification    | ▪ Laboratory Control Sample |
| ▪ Continuing Calibration Verification | ▪ Detection Limit Results   |

- Blanks

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and Holding Times**

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Ds were within 15% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

### **Matrix Spike**

A MS / MSD was performed on sample 2001667 and was within QC acceptance limits for %R and RPD for TPH and cyanide.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH and cyanide.

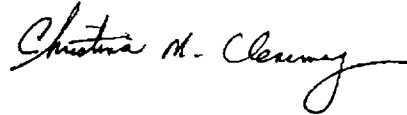
## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane was qualified as rejected based on low percent recovery (<10%) for the MS and MSD analyses. Carbon disulfide and 1,1-Dichloroethane were qualified as estimated based on low percent recovery for the MS and MSD analyses. 4-Methyl-2-pentanone and 2-Hexanone were qualified as estimated based on high continuing calibration drift. Many SVOC compounds were qualified as estimated due to high MS / MSD RPD. A description of the qualified sample results are outlined in Tables

3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/11/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/09/02

---

A Tier II data validation was performed on data for twelve soil samples collected on January 9, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-11-012 through WT-CS-11-023. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201299 (batch 12544).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 10.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Fourteen samples were shipped to Premier Laboratory under chain of custody on 01/09/02. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for “other” constituents. Validation of PCBs is discussed in this report. The validation of the “other” constituents is discussed under a separate cover. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are*



*assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001657 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

No field duplicates were submitted with this data set.

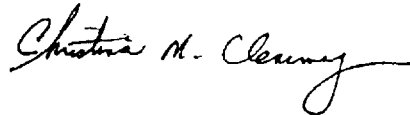
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical

error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/11/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/09/02

---

A Tier II data validation was performed on data for four soil samples collected on January 9, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as "other" parameters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201299.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |
| ▪ Initial and Continuing Calibration | ▪ Practical Quantitation Limits         |

- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on January 9, 2002. The laboratory received the samples on January 9, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 10.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001657. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	40	40	60-142		J	J	Low	2001657

The non-detect result for chloroethane in the unspiked sample was qualified as an estimated result.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and*



*direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 10.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All target compounds were within acceptance limits for SVOC compounds for the

initial and continuing calibrations, with the exception of 2,4-Dinitrophenol, which was outside the continuing calibration acceptance criteria (29 %D). All affected samples will be qualified as estimated.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001657. All data met the QC acceptance criteria.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the SVOC laboratory control sample.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

### **INORGANIC DATA REVIEW**

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

## DISCUSSION

### Performance Evaluation Data

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

### Calibration Verification

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001657. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than

35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A field duplicate pair was not submitted with this data set.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

All QC acceptance criteria were met for percent recovery for the metals laboratory control sample.

## **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and Cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and Holding Times**

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Ds were within 15% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

### **Matrix Spike**

A MS / MSD was performed on sample 2001657 and was within QC acceptance limits for %R and RPD for TPH and cyanide.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH and cyanide.

### **OVERALL EVALUATION OF THE DATA**

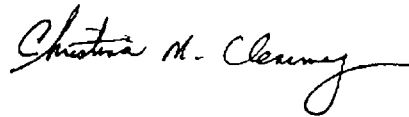
The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of



analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane was qualified as estimated based on low percent recovery for the MS and MSD analyses. 2,4-Dinitrophenol was qualified as estimated based on high continuing calibration drift. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/11/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/09/02

---

A Tier II data validation was performed on data for eight soil samples collected on January 9, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-08-020 through WT-CS-08-025. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201296 (batch 12536).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001647) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0104-02-15.1. Aroclor 1254 was spiked into the sample at a concentration of 4.27 ug/l. The performance acceptance limit was 2.19-5.64 ug/l. The laboratory reported a concentration of 4.2 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6.0°C and 10.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Fifteen samples were shipped to Premier Laboratory under chain of custody on 01/09/02. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for “other” constituents. Validation of PCBs is discussed in this report. The validation of the “other” constituents is discussed under a separate cover. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001642 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

Samples 2001640/ 2001641 and 2001644/2001645 were submitted as field duplicate

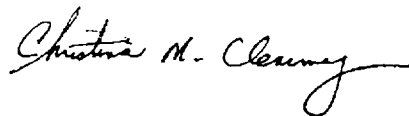
pairs. The RPD for 2001640/ 2001641 were not calculated since both results were non-detect. For samples 2001644/2001645, the result for Aroclor 1254 was 1100/1100, respectively (RPD=0%), and the result for Aroclor 1260 was 350/350, respectively (RPD=0%).

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/08/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/09/02

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A Tier II data validation was performed on data for three soil samples and a trip blank (2001646) collected on January 9, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as “other” parameters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201296.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |
| ▪ Initial and Continuing Calibration | ▪ Practical Quantitation Limits         |



- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on January 9, 2002. The laboratory received the samples on January 9, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Seventeen VOCs were spiked into the sample. All PE data were within vendor-certified acceptance limits.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 10.0°C and 6.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001646) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001642. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	41	37	60-142		J	J	Low	2001642

The non-detect result for chloroethane in the unspiked sample was qualified as an estimated result.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

### **Field Duplicate**

Samples 2001644 / 2001645 were submitted as field duplicate pair. The RPD for 2001644 / 2001645 were not calculated since both results were non-detect.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on*

*laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Forty SVOCs were spiked into the sample. All PE data were within vendor-certified acceptance limits.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 10.0°C and 6.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All target compounds were within acceptance limits for SVOC compounds for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001642. All data met the QC acceptance criteria.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the SVOC laboratory control sample.

### **Field Duplicate**

Samples 2001644 / 2001645 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

<b>Compound</b>	<b>Sample # 2001644</b>	<b>Duplicate # 2001645</b>	<b>RPD</b>	<b>Action</b>	<b>Affected Samples</b>
Chrysene	190	220	15%	A	2001644, 2001645
Fluoranthene	360	360	0%	A	2001644, 2001645
Phenanthrene	180	ND	NC	A	2001644, 2001645
Pyrene	300	330	10%	A	2001644, 2001645

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for all compounds.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

### **INORGANIC DATA REVIEW**

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |  |                                     |
|--|-------------------------------------|
| ▪ Performance Evaluation Data              | ▪ Matrix Spike                      |
| ▪ Agreement with Chain of Custody          | ▪ Field Duplicates                  |
| ▪ Preservation and Technical Holding Times | ▪ Laboratory Duplicates             |
|  | ▪ Furnace AA / Post Digestion Spike |
| ▪ Calibration Verification                 | ▪ Laboratory Control Sample         |
| ▪ Blanks                                   | ▪ Serial Dilution Results           |
| ▪ ICP Interference Check Sample            | ▪ Detection Limit Results           |

### **DISCUSSION**

#### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and*



*direction of the quantitative bias.*

Eleven metals were spiked into the sample. All PE data were within vendor-certified acceptance limits.

### **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

### **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001642. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

Samples 2001644 / 2001645 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001644	Duplicate # 2001645	RPD	Action	Affected Samples
Arsenic	1.3	0.95	31%	A	2001644, 2001645
Barium	27	27	0%	A	2001644, 2001645

Cadmium	0.82	1.5	59%	J	2001644, 2001645
Chromium	9.4	18	63%	J	2001644, 2001645
Copper	17	12	34%	A	2001644, 2001645
Lead	27	28	4%	A	2001644, 2001645
Nickel	35	25	33%	A	2001644, 2001645
Silver	0.20	0.65	106%	J	2001644, 2001645
Zinc	100	110	10%	A	2001644, 2001645
Mercury	.046	0.072	44%	A	2001644, 2001645

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for all compounds except cadmium, chromium, and silver.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

All QC acceptance criteria were met for percent recovery for the metals laboratory control sample.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and Cyanide. There are currently no Region 1 functional

guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

All PE data for TPH and cyanide were within vendor-certified acceptance limits.

### **Preservation and Holding Times**

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Ds were within 15% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

### **Matrix Spike**

A MS / MSD was performed on sample 2001642 and was within QC acceptance limits for %R and RPD for TPH and cyanide.

### **Field Duplicate**

Samples 2001644 / 2001645 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

<b>Compound</b>	<b>Sample # 2001644</b>	<b>Duplicate # 2001645</b>	<b>RPD</b>	<b>Action</b>	<b>Affected Samples</b>
TPH	470	1000	72%	J	2001644, 2001645

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results

greater than two times the detection limit. Results were qualified as estimated.

### **Laboratory Control Sample**

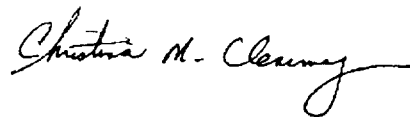
All QC acceptance criteria were met for LCS for TPH and cyanide.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane was qualified as estimated based on low percent recovery for the MS and MSD analyses. Cadmium, chromium, silver and TPH were qualified as estimated based on high field duplicate precision. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/10/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 1/08/02

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A Tier II data validation was performed on data for nine wipe samples collected on January 8, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-08-012 through WT-CS-08-019. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201226 (batch 12474).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 8.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.



## **Agreement with the Chain of Custody**

Nine samples were shipped to Premier Laboratory under chain of custody on 01/08/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All linear regression coefficients ( $R^2$ ) were greater than .990.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank or in the equipment blank (2001637).

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was not performed on a LEA sample with this data set.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

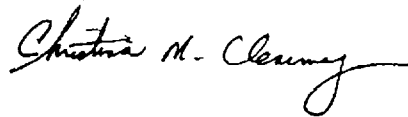
No field duplicates were submitted with this data set.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is written in a cursive style with a long horizontal flourish at the end.

Authorized Pratt & Whitney Representative \_\_\_\_\_



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/09/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/07/02

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A Tier II data validation was performed on data for eleven soil samples collected on January 7, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-11-001 through WT-CS-11-011. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201171 (batch 12454).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001628) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0103-02-04.2. Aroclor 1254 was spiked into the sample at a concentration of 7.33 ug/l. The performance acceptance limit was 3.75-9.68 ug/l. The laboratory reported a concentration of 6.2 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 7.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Thirteen samples were shipped to Premier Laboratory under chain of custody on 01/07/02. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for “other” constituents. Validation of PCBs is discussed in this report. The validation of the “other” constituents is discussed under a separate cover. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All linear regression coefficients ( $R^2$ ) were greater than .990.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001620 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

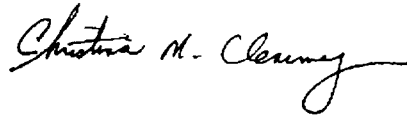
No field duplicates were submitted with this data set.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative





Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/11/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/07/02

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A Tier II data validation was performed on data for eleven soil samples and a trip blank (2001627) collected on January 7, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as “other” paramters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201171.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |
| ▪ Initial and Continuing Calibration | ▪ Practical Quantitation Limits         |

- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on January 7, 2002. The laboratory received the samples on January 7, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 7.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of*

*contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001627) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001620. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	45	40	60-142		J	J	Low	2001620

The non-detect result for chloroethane in the unspiked sample was qualified as an estimated result.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

### **Field Duplicate**

A field duplicate was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide*

*information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 7.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All target compounds were within acceptance limits for SVOC compounds for the initial and continuing calibrations.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

## **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

The following table summarizes VOC QC acceptance criteria that were not met for internal standard (IS) area counts and retention times:



Sample Number	Internal Standard	Area Counts	Ret. Time	Area counts QC Range	Ret.Time QC Range	Detect	Non-detect
2001626	Chrysene-d12	245339	20.63	511557-2046228	19.92-20.92	J	UJ
2001626	Perylene-d12	133569 (<20%)	23.87	424970-1699882	23.24-24.24	J	R

All affected data were qualified accordingly.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001620. All data met the QC acceptance criteria.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria for percent recovery for the SVOC laboratory control sample.

### **Field Duplicate**

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

## **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |  |                                     |
|--|-------------------------------------|
| ▪ Performance Evaluation Data              | ▪ Matrix Spike                      |
| ▪ Agreement with Chain of Custody          | ▪ Field Duplicates                  |
| ▪ Preservation and Technical Holding Times | ▪ Laboratory Duplicates             |
|  | ▪ Furnace AA / Post Digestion Spike |
| ▪ Calibration Verification                 | ▪ Laboratory Control Sample         |
| ▪ Blanks                                   | ▪ Serial Dilution Results           |
| ▪ ICP Interference Check Sample            | ▪ Detection Limit Results           |

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

## **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

## **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

## **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

## **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

## **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the*

*sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001581. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A field duplicate was not submitted with this data set. Field duplicates are submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Zinc	74.7	80-120	J	UJ	All

All data were qualified accordingly.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

### **DISCUSSION**

#### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and Holding Times**

All samples analyzed for TPH were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Ds were within 15% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

### **Matrix Spike**

A MS / MSD was performed on sample 2001620 and was within QC acceptance limits for %R and RPD for TPH.

## **Field Duplicate**

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

## **Laboratory Control Sample**

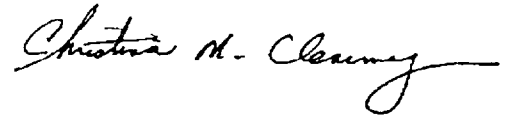
All QC acceptance criteria were met for LCS for TPH.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane was qualified as estimated based on low percent recovery for the MS and MSD analyses. Internal standard area counts for Chrysene-d12 and Perylene-d12 were low – results were qualified as estimated and rejected, respectively, for sample 2001626. Zinc results were qualified as estimated based on low percent recovery for the LCS sample. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is written in a cursive style with a long horizontal flourish at the end.

Authorized Pratt & Whitney Representative





Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/10/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/04/02

---

A Tier II data validation was performed on data for eight soil samples collected on January 4, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-08-005 through WT-CS-08-016. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201124 (batch 12417).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001610) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0103-02-04.1. Aroclor 1254 was spiked into the sample at a concentration of 2.54 ug/l. The performance acceptance limit was 1.30-3.35 ug/l. The laboratory reported a concentration of 2.4 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.3°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Seventeen samples were shipped to Premier Laboratory under chain of custody on 01/02/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

## **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001605 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

## **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## **Field Duplicate**

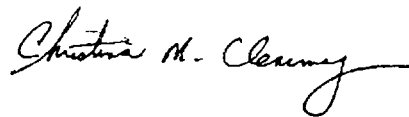
Samples 2001605 / 2001606 were submitted as field duplicate pairs. The result for Aroclor 1254 for samples 2001605 / 2001606 was ND/78, respectively. The data was not qualified since the positive result was less than 2 times the detection limit.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



\_\_\_\_\_  
Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
Sample Date: 01/04/02  
DV Date: 01/15/02

Project Name: Willow Brook Pond PCB Remediation  
DV Report for Other Parameters

---

A Tier II data validation was performed on data for sixteen soil samples collected on January 4, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank and a performance sample was included with the sample delivery group. The performance sample was submitted for PCBs and 'other' parameters. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201124.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using

the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |

- Initial and Continuing Calibration
- Practical Quantitation Limits
- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Eight soil samples, one trip blank and one performance sample were relinquished to Premier Laboratory, LLC under chain-of-custody on January 4, 2002. The laboratory received the samples on January 4, 2002. Three soil samples were selected for “other parameters.” During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Twenty-one VOCs were spiked into the sample. All PE data were within vendor-certified acceptance limits.

### **Preservation and technical holding times**



*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 9.3°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of*

*contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

The trip blank (2001609) and the method blank were evaluated for contamination for VOCs. No detects were reported in the blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All internal standard area counts and retention times were within acceptance limits.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001605 (Batch 12461). The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	47	38	50-147		J	J	Low	2001605
Methylene Chloride	126		59—117		J	A	High	2001605
1,1-Dichloroethene		39	63-118	92.0	J	J	Low	2001605

There were no detects reported in the unspiked sample. All affected data were qualified accordingly.

#### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

The laboratory control samples were within acceptance limits.

#### **Field Duplicate**

Samples 2001605 / 2001606 were submitted as field duplicate pair. The RPD for 2001605 / 2001606 were not calculated since both results were non-detect.

#### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

### **SEMIVOLATILE ORGANIC ANALYSES**

#### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Forty-two SVOCs were spiked into the sample. All PE data were within vendor-certified acceptance limits.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 9.3°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative*

*and quantitative data.*

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All internal standard area counts and retention times were within acceptance limits.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001605. All data met the QC acceptance criteria.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

The laboratory control samples were within acceptance limits.

### **Field Duplicate**

Samples 2001605 / 2001606 were submitted as field duplicate pair. The RPD for 2001605 / 2001606 were not calculated since both results were non-detect.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |  |                                     |
|--|-------------------------------------|
| ▪ Performance Evaluation Data              | ▪ Matrix Spike                      |
| ▪ Agreement with Chain of Custody          | ▪ Field Duplicates                  |
| ▪ Preservation and Technical Holding Times | ▪ Laboratory Duplicates             |
|  | ▪ Furnace AA / Post Digestion Spike |

- Calibration Verification
- Laboratory Control Sample
- Blanks
- Serial Dilution Results
- ICP Interference Check Sample
- Detection Limit Results

## DISCUSSION

### Performance Evaluation Data

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Ten metals were spiked into the sample. The following table summarizes the PE data that were not within vendor-certified acceptance limits:

Compound	Reported Concentration (mg/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
Zinc	.099	1.37	1.20-1.54	J	J	Low	All samples in data set

### Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

### Calibration Verification

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001605. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than



35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

Samples 2001605 / 2001606 were submitted as field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001605	Duplicate # 2001606	RPD	Action	Affected Samples
Barium	16	14	13%	A	2001605, 2001606
Chromium	6.8	4.8	34%	A	2001605, 2001606
Copper	4.2	3.8	10%	A	2001605, 2001606
Lead	2.3	1.5	42%	A	2001605, 2001606
Nickel	8.9	7.2	21%	A	2001605, 2001606
Zinc	9.8	9.4	4%	A	2001605, 2001606

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion*

*procedure.*

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Zinc	74.7	80-120	J	UJ	All

All data were qualified accordingly.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

All PE data were within vendor-certified acceptance limits.

### **Preservation and Holding Times**

All samples analyzed for TPH were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

### **Matrix Spike**

A MS / MSD was performed on sample 2001605 and was within QC acceptance limits for %R and RPD for TPH.

### **Field Duplicate**

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH.

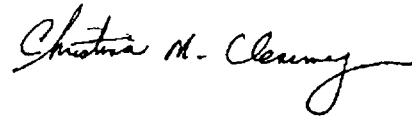
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane and Methylene Chloride were qualified as estimated based on low percent recovery for the MS / MSD analyses. 1,1-Dichloroethene was qualified as estimated based on low percent recovery and high RPD for the MSD analysis. Zinc results were qualified as estimated based on low percent recovery for the LCS sample. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance

Standards identified in Remedial Action Work Plan.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/08/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/03/02

---

A Tier II data validation was performed on data for nineteen soil samples collected on January 3, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-09-028 through WT-CS-09-46. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201085 (batch 12394).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001600) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 1214-01-09.2. Aroclor 1254 was spiked into the sample at a concentration of 6.11 ug/l. The performance acceptance limit was 3.13-8.06 ug/l. The laboratory reported a concentration of 5.4 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Twenty-one samples were shipped to Premier Laboratory under chain of custody on 01/03/02. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for “other” constituents. Validation of PCBs is discussed in this report. The validation of the “other” constituents is discussed under a separate cover. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*



No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001581 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

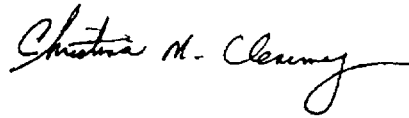
No field duplicates were submitted with this data set.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/09/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/03/02

---

A Tier II data validation was performed on data for nineteen soil samples and a trip blank (2001599) collected on January 3, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as "other" parameters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201085.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |
| ▪ Initial and Continuing Calibration | ▪ Practical Quantitation Limits         |

- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on January 3, 2002. The laboratory received the samples on January 3, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 9.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001599) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001581 and 2001590. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	41	40	60-142		J	J	Low	2001581
Chloroethane	41	40	60-142		J	J	Low	2001590

The non-detect result for chloroethane in the unspiked sample was qualified as an estimated result.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

### **Field Duplicate**

A field duplicate was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide*



*information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 9.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All target compounds were within acceptance limits for SVOC compounds for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

The following table summarizes SVOC data that did not meet acceptance criteria:

Sample Number	Surrogate-1 (Acid)	Surrogate-2 (Acid)	%R -1	%R -2	QC acceptance Criteria	Detects	Non-detects
2001581MS	4-Terphenyl-d14		147		19-139	J	A

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by*

*assessing internal standard area count recovery and retention time drift.*

All SVOC QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001581. Several SVOC compounds were outside acceptance criteria for percent recovery (%REC) and/or for relative percent difference (RPD) between the MS and MSD analyses. All affected data were qualified as estimated (J), except for 2-Nitroaniline and 3-Nitroaniline, which were qualified as rejected (R) due to low %REC. Refer to the attached SVOC data tables for a list of affected compounds.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria for percent recovery for the SVOC laboratory control sample.

### **Field Duplicate**

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

## **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |  |                                     |
|--|-------------------------------------|
| ▪ Performance Evaluation Data              | ▪ Matrix Spike                      |
| ▪ Agreement with Chain of Custody          | ▪ Field Duplicates                  |
| ▪ Preservation and Technical Holding Times | ▪ Laboratory Duplicates             |
|  | ▪ Furnace AA / Post Digestion Spike |
| ▪ Calibration Verification                 | ▪ Laboratory Control Sample         |
| ▪ Blanks                                   | ▪ Serial Dilution Results           |
| ▪ ICP Interference Check Sample            | ▪ Detection Limit Results           |

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

### **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the*

*sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001581. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A field duplicate was not submitted with this data set. Field duplicates are submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
---------	----	----------	---------	-------------	------------------

Lead	76.0	80-120	J	UJ	All
Cyanide	77.0	80-120	J	UJ	All

All data were qualified accordingly.

All data met the QC acceptance criteria for percent recovery (%R) criteria.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

### **DISCUSSION**

## **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

## **Preservation and Holding Times**

All samples analyzed for TPH were extracted within method-specified holding times.

## **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

## **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

## **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

## **Matrix Spike**



A MS / MSD was performed on sample 2001581 and was within QC acceptance limits for %R and RPD for TPH.

### **Field Duplicate**

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH.

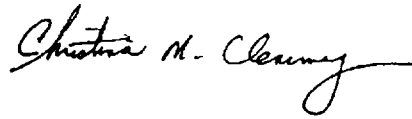
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Some SVOC results were qualified as estimated based on high % REC in the MS and/or high RPD between the MS and MSD analyses. Chloroethane was qualified as estimated based on low percent recovery for the MS and MSD analyses. Lead and Cyanide results were qualified as estimated based on low percent recovery for the LCS sample. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance

Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/08/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/02/02

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A Tier II data validation was performed on data for sixteen soil samples collected on January 2, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-09-016 through WT-CS-09-027, and WT-CS-06-032 through WT-CS-06-034. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201032 (batch 12380).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001579) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 1219-01-08.1. Aroclor 1254 was spiked into the sample at a concentration of 4.58 ug/l. The performance acceptance limit was 2.34-6.04 ug/l. The laboratory reported a concentration of 3.6 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation*

*techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.3°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Seventeen samples were shipped to Premier Laboratory under chain of custody on 01/02/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs. LEA samples (2001570, 2001571, and 2001572) were diluted out due to elevated concentrations of Aroclor 1254 and Aroclor 1260.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001533 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

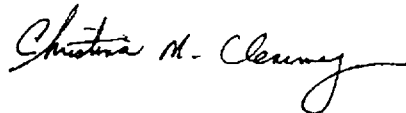
Samples 2001566 / 2001567 were submitted as field duplicate pairs.. The RPD for 2001566 / 2001567 were not calculated since both results were non-detect.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



\_\_\_\_\_  
Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/07/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 12/31/01

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A Tier II data validation was performed on data for three soil samples collected on December 31, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-09-013 through WT-CS-09-015. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112A83(batch 12340).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data



Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 4.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Three samples were shipped to Premier Laboratory under chain of custody on 12/31/01. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001560 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

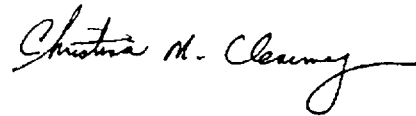
No field duplicates were submitted with this data set.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/07/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 12/28/01

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A Tier II data validation was performed on data for six soil samples collected on December 28, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-09-007 through WT-CS-09-012. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112A41 (batch 12314).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 4.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Six samples were shipped to Premier Laboratory under chain of custody on 12/28/01. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001554 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

No field duplicates were submitted with this data set.

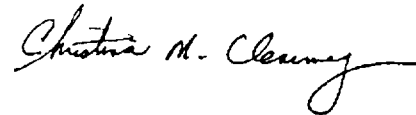
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.



No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is written in a cursive style with a long horizontal flourish at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/08/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 12/27/01

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A Tier II data validation was performed on data for three soil samples collected on December 27, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-09-004 through WT-CS-09-006. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112989 (batch 12264).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 5.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Three samples were shipped to Premier Laboratory under chain of custody on 12/27/01. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001551 with this data set. Due to elevated concentrations of Aroclor 1254 (53000 ug/kg ) in the unspiked sample, the %R and RPD could not be evaluated.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

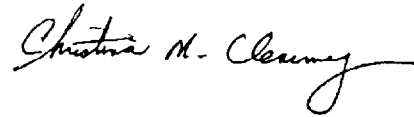
No field duplicates were submitted with this data set.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is written in a cursive style with a long horizontal flourish at the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/08/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 12/21/01

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A Tier II data validation was performed on data for eighteen soil samples collected on December 21, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-06-023 through WT-CS-06-030, WT-CS-06-006, WT-CS-08-001 through WT-CS-08-004, and WT-CS-09-001 through WT-CS-09-003. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112877 (batch 12219).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001550) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 1214-01-09.1. Aroclor 1254 was spiked into the sample at a concentration of 2.04 ug/l. The performance acceptance limit was 1.04-2.69 ug/l. The laboratory reported a concentration of 1.9 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation*



*techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was between 10°C – 11°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Twenty samples were shipped to Premier Laboratory under chain of custody on 12/21/01. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for “other” constituents. Validation of PCBs is discussed in this report. The validation of the “other” constituents is discussed under separate cover. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001533 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## **Field Duplicate**

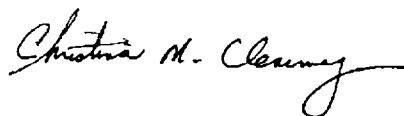
Samples 2001539 / 2001540 and 2001541 / 2001542 were submitted as field duplicate pair. The RPD for 2001539 / 2001540 and 2001541 / 2001542 were not calculated since both results were non-detect. Samples 2001539 and 2001540 were collected from the same location as samples 2001512 and 2001513, which were the field duplicates collected on 12/17/01 that had the serious duplicate precision discrepancy. All four samples were collected from WT-CS-06-006. Three of the samples were reported as Non-detected. Only sample 2001513 was reported with concentration of 14000 for Aroclor 1254 and 10000 for Aroclor 1260.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/07/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 12/21/01

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A Tier II data validation was performed on data for three soil samples and a trip blank (2001549) collected on December 21, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. Additional samples were submitted with this SDG for PCB analysis. Validation of the PCB data was performed and submitted as a separate validation report. This validation report consists of data for VOCs (8260B), SVOCs (8270C), TPH (418.1), Metals (6010B) and Cyanide (9012), herein referred to as “other” parameters.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E112877.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Where there was a lack of guidance for other parameters, the same logic as presented in Region 1, EPA validation guidelines for similar parameters / methodologies were used where applicable. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |
| ▪ Initial and Continuing Calibration | ▪ Practical Quantitation Limits         |

- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on December 21, 2001. The laboratory received the samples on December 21, 2001. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this SDG for the “other” parameters as discussed in this validation memorandum.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 10.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

The following tables summarize VOC compounds that were outside QC acceptance criteria for the initial and continuing calibrations:

#### **Initial Calibration for VOCs**

All VOC target compounds were within acceptance limits.

### Continuing Calibration for VOCs

The following table summarizes VOC target compounds that did not meet acceptance criteria:

Compound	RRF or linear regression	%D	Positive detects	NDs	Affected samples
Carbon Disulfide		33	J	J	All

All affected results were qualified accordingly.

### Blanks

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001549) and all method blanks were evaluated for contamination for VOCs. No detects were reported in the blanks.

### Surrogate Compounds

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.



## Internal Standards

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All QC acceptance criteria were met for internal standard (IS) area counts and retention times.

## Matrix Spike / Matrix Spike Duplicate Analyses

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001533. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	45		60-142		J	J	Low	2001533

The non-detect result for chloroethane in the unspiked sample was qualified as an estimated result.

## Laboratory Control Sample

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery for the VOC laboratory control sample.

## **Field Duplicate**

A field duplicate was not submitted with this data set.

## **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance sample was not submitted with this SDG for SVOCs.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 10.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice during transport. All samples were extracted and analyzed within method specified holding times.

## **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

## **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All target compounds were within acceptance limits for SVOC compounds for the initial and continuing calibrations.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

All QC acceptance criteria were met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All SVOC QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001533. Several SVOC compounds were outside acceptance criteria for relative percent difference (RPD) between the MS and MSD analyses. All affected data were qualified as estimated (J). Refer to the attached SVOC data tables for a list of affected compounds.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria for percent recovery for the SVOC laboratory control sample.

## **Field Duplicate**

A few duplicate pair was not submitted with this data set. Field duplicates were submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

## **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

Inorganic data review includes a review of data for RCRA 8 metals plus copper, nickel, zinc and cyanide.

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |  |                                     |
|--|-------------------------------------|
| ▪ Performance Evaluation Data              | ▪ Matrix Spike                      |
| ▪ Agreement with Chain of Custody          | ▪ Field Duplicates                  |
| ▪ Preservation and Technical Holding Times | ▪ Laboratory Duplicates             |
|  | ▪ Furnace AA / Post Digestion Spike |
| ▪ Calibration Verification                 | ▪ Laboratory Control Sample         |
| ▪ Blanks                                   | ▪ Serial Dilution Results           |
| ▪ ICP Interference Check Sample            | ▪ Detection Limit Results           |

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide*

*information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

### **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limits (80-120%) for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All analytes were within acceptance limits (80-120%) for percent recovery for the ICP Interference Check Sample.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001533. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A field duplicate was not submitted with this data set. Field duplicates are submitted at a frequency of one per twenty samples and are tracked on an on-going basis.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

The following table summarizes data that did not meet acceptance criteria (80-125%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Arsenic	70.3	80-120	J	UJ	All

All data were qualified accordingly.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

### **DISCUSSION**



## **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

## **Preservation and Holding Times**

All samples analyzed for TPH were extracted within method-specified holding times.

## **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

## **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

## **Blanks**

No detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

### **Matrix Spike**

A MS / MSD was performed on sample 2001533 and was within QC acceptance limits for %R and RPD for TPH.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set. Field duplicates are submitted at a frequency of one per 20 and tracked on an on-going basis.

### **Laboratory Control Sample**

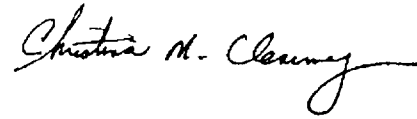
All QC acceptance criteria were met for %R for the LCS for TPH.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Some VOC results were qualified based on high % Drift between the initial and continuing calibration and low % Recovery in the Matrix Spike sample. Some SVOC results were qualified as estimated based on high Relative Percent Difference between the Matrix Spike and Matrix Spike Duplicate analyses. Arsenic results were qualified as estimated based on low percent recovery for the Laboratory Control Sample. A description of the qualified sample results are outlined in Tables 3 and 4 for each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/07/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 12/19/01

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A Tier II data validation was performed on data for five wipe samples collected on December 9 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-6-018 through WT-CS-06-022. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112750 (batch 12174).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 4.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Five samples were shipped to Premier Laboratory under chain of custody on 12/19/01. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was not performed on a LEA sample with this data set.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

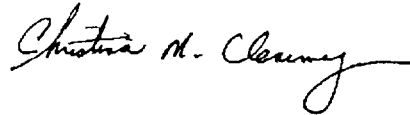
No field duplicates were submitted with this data set.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is written in a cursive style with a long horizontal flourish at the end.

Authorized Pratt & Whitney Representative





Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/08/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 12/17/01

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A Tier II data validation was performed on data for thirteen soil samples collected on December 17, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-06-005 through WT-CS-06-015. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112639 (batch 12097).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001525) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 1213-01-01.1. Aroclor 1254 was spiked into the sample at a concentration of 4.38 ug/l. The performance acceptance limit was 2.24-5.78 ug/l. The laboratory reported a concentration of 4.3 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 8°C and 10°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Fifteen samples were shipped to Premier Laboratory under chain of custody on 12/17/01. The samples were analyzed for PCBs by SW846 Method 8082. Samples were also submitted for “other” constituents. Validation of PCBs is discussed in this report. The validation of the “other” constituents is discussed under separate cover. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs. Due to elevated concentrations of Aroclor 1254 and Aroclor 1260, LEA sample (2001513) was diluted out.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was performed on sample 2001512 with this data set. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

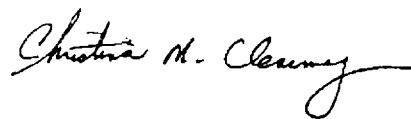
Samples 2001512 / 2001513 and 2001522 / 2001523 were submitted as field duplicate pairs. There was a serious problem for the field duplicate data for samples 2001512 and 2001513. The results were reported as 14000 ug/kg Aroclor 1254 and 10000 Aroclor 1260 in sample 2001512 and Non-detect in sample 2001513. The project manager was notified during validation and the duplicate location was resampled (2001539 / 2001540) on 12/21/01. These samples were both reported as ND<48. The results for samples 2001512 and 2001513 were qualified as estimated based on poor duplicate precision; however, the second set of samples confirms that there was probably a field or laboratory error associated with the first set. The RPD for 2001522 / 2001523 was not calculated since both results were non-detect. Field duplicate precision was considered acceptable for these samples.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Data were qualified based on poor field duplicate precision or sampling / laboratory error due to the high discrepancy between the duplicate results.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/07/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 12/14/01

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A Tier II data validation was performed on data for four wipe samples collected on December 14, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-6-001 through WT-CS-06-004. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E112592 (batch 12059).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Four samples were shipped to Premier Laboratory under chain of custody on 12/17/01. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*



Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was not performed on a LEA sample with this data set.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

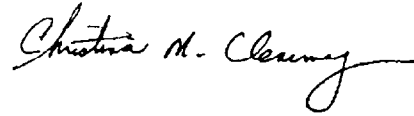
No field duplicates were submitted with this data set.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 11/29/01

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 11/27/01

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A Tier II data validation was performed on data for two wipe samples collected on November 27, 2001 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-06-001 through WT-CS-06-002. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E111A74. Samples 2001320 and 2001321 were analyzed within the analytical batch 11587.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 13.9°C, which was outside the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. The courier often must wait for sample collection process to be completed and therefore the samples are often at ambient

temperature. Since the trip from the Site to the laboratory is generally completed in approximately one hour, the samples do not have sufficient time to lower to 4°C. This issue does not impact data usability.

### **Agreement with the Chain of Custody**

Two samples were shipped to Premier Laboratory under chain of custody on 11/27/01. The samples were analyzed for PCBs by SW846 Method 8082. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curve was performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

## **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

A matrix spike / matrix spike duplicate was not performed with this data set.

## **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## **Field Duplicate**

A field duplicate pair was not submitted with this data set.

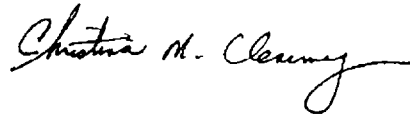
## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical

error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Authorized Pratt & Whitney Representative

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**INDOOR AIR MONITORING  
IN SUPPORT OF  
VCAP RISK ASSESSMENT  
(December 21, 2000, March 1, 2001,  
June 18, 2001 and September 21, 2001)**

**Pratt & Whitney  
Andrew Willgoos Turbine Laboratory  
Pent Road, East Hartford, CT**

**October 2001**

**UNITED TECHNOLOGIES CORPORATION  
One Financial Plaza  
Hartford, CT 06101**

**LOUREIRO ENGINEERING ASSOCIATES, INC  
100 Northwest Drive  
Plainville, Connecticut**

**Comm. No. 68VC132.001**

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## **TABLES**

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Table 2	Summary of Analytical Results (Detects)
Table 3	Summary of Analytical Results
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## **DRAWINGS**

Drawing 1: Air Sampling Locations

## **ATTACHMENTS**

ATTACHMENT 1	Field Forms
ATTACHMENT 2	Copies of Analytical Reports
ATTACHMENT 3	Applicable VCAP Screening Levels

## **ACRONYMS**

CSM	Conceptual Site Model
GC/MS	Gas Chromatograph/Mass Spectroscopy
QA/QC	Quality Assurance/Quality Control
LEA	Loureiro Engineering Associates, Inc.
P&W	Pratt & Whitney
RPD	Relative Percent Difference
SL	Screening Level
UTC	United Technologies Corporation
VCAP	Voluntary Corrective Action Process
VOC	Volatile Organic Compound

## 1. INTRODUCTION

On behalf of United Technologies Corporation (UTC) Loureiro Engineering Associates, Inc. (LEA) performed indoor air monitoring on December 21, 2000, March 1, 2001, June 18, 2001, and September 21, 2001 at the Pratt & Whitney Andrew Willgoos Turbine Laboratory (Willgoos) facility, located on Pent Road in East Hartford, Connecticut. This monitoring was performed in support of the Voluntary Corrective Action Program (VCAP) Risk Assessment. The purpose of the air sampling was to characterize indoor air volatile organic compound (VOC) concentrations resulting from process and environmental sources.

The sampling was performed in accordance with the December 21, 2000 submittal entitled, *Indoor Air Monitoring In Support Of Stabilization December 21, 2000 Pratt & Whitney Pent Road (Andrew Willgoos Turbine Laboratory), East Hartford, CT*. Samples were collected from six locations throughout the facility during each sampling event from locations representative of current and historic process operations. In addition, one field blank sample was collected during the March 2001, June 2001, and September 2001 monitoring events.

The quarterly event exhibiting the highest concentrations of VOCs, based on the results obtained during the quarterly sampling from WG-RSK-AS-06, (or WG-RSK-AS-16 as it is currently represented) will be selected for annual sampling events. The highest VOC concentrations over the four previous monitoring events were observed during the June 2001 indoor air monitoring event. Sampling events will be conducted on an annual basis during the selected quarter (June of each year) at six locations.



## 2. SUMMARY

Four rounds of indoor monitoring<sup>1</sup> were performed at the Willgoos facility on December 21, 2000, March 1, 2001, June 18, 2001, and September 21, 2001 to verify that indoor workers are not being exposed to volatile organic compounds via indoor air inhalation at concentrations above the generic Pratt & Whitney screening levels. More specifically the screening levels are listed in Table 3-4 of the report entitled, *Conceptual Site Models and Screening Levels for Pratt & Whitney's VCAP Connecticut Facilities (CSM)*. The Gradient Corporation issued the CSM on December 19, 1997, revised September 18, 1998 and again on September 15, 1999.

The samples were collected on multimedia (thermal desorption) tubes and charcoal tubes. They were analyzed in accordance with modified EPA Method T01/T02 for an expanded list of VOCs. The laboratory analytical results of the December 21, 2000 air sampling indicated indoor air concentrations of benzene above the VCAP screening levels.

The second round of indoor air sampling was performed on March 1, 2001. These samples were collected from the same approximate locations as the December 2000 samples. One additional control (field blank) sample was collected on the premises outside the buildings for quality assurance/quality control (QA/QC) purposes. The March 2001 samples did not indicate the presence of any concentrations above the VCAP criteria.

The same locations were sampled again during a third round on June 18, 2001. Relatively elevated benzene concentrations were observed in the samples collected in the pump house in both the thermal desorption tube and charcoal tube. It should be noted that during sample collection fuel was being accumulated in drainage buckets in the basement of the pump house and the smell of fuel was evident. In addition, an exceedance of trans-1,2-dichloroethylene was reported at location WG-RSK-AS-15 based on the results of the charcoal analysis.

The fourth round of indoor air sampling was performed on September 21, 2001 from the same approximate locations as the December 2000 samples. A duplicate sample was collected during the September 21, 2001 from location WG-RSK-AS-15 where trans-1,2-dichloroethylene was reported at an elevated concentration during the June 18, 2001 monitoring event. No exceedances were observed at any of the locations sampled during the September 21, 2001 monitoring event. The concentration of trans-1,2-dichloroethylene was approximately 3 orders

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<sup>1</sup> One additional indoor-air monitoring event has been conducted at the Pratt & Whitney Willgoos facility on November 2, 1998. The results have been presented in a report enclosed as Appendix D in the 10<sup>th</sup> VCAP Progress Report dated February/March 1999.

